

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the following remarks.

Claims 1-15 are currently pending in this application, with Claims 1 and 11 being the only independent claims.

The Official Action rejects Claim 1 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,027,618 to *Aruga et al.* in view of U.S. Patent No. 6,336,546 to *Lorenz*.

Claim 1 is generally directed to a substrate processing device that includes, among other things, a substrate carrying system which passes through a plurality of vacuum processing chambers. The system comprises a number of features including an outward carry line, a return carry line, and at least one of a second outward carry line and a second return carry line.

Aruga et al. discloses an in-line film deposition system having a plurality of vacuum chambers 2 arranged along a polygonally-shaped transfer path 30. Carriers 3 holding substrates 1 are transferred through the plurality of vacuum processing chambers 2 so that a film deposition process is continuously carried out on the substrates 1.

Lorenz discloses a conveying system for transporting wafers. The conveying system includes a plurality of parallel conveyors 5 which run parallel to each other and in opposite directions in a first conveying system 1. Secondary conveying systems 3 branch off from the conveyors 5 of the primary conveying system 1 and extend toward, but do not travel through, various processing centers 2. The purpose

of using parallel conveyors in the primary system 1 is to provide a buffer in which cassettes not being used can be stored. See column 6, lines 10-14.

Lorenz further discloses a handling unit 4 for transporting cassettes within a respective processing center 2. The handling unit 4 conveys the cassettes to and from the various processing stations 10 within each processing center 2. See column 7, lines 1-4. However, neither the conveyors 1, 3, 5 nor the handling unit 4 pass through any of the processing stations 10.

The Official Action takes the position that it would have been obvious to modify *Aruga et al.* to include an additional outward or return carry line as disclosed in *Lorenz*. However, this characterization is not accurate at least because *Aruga et al.* and *Lorenz* are non-analogous art. One skilled in the art would not have been motivated to look toward *Lorenz* for direction in modifying *Aruga et al.* at least because *Aruga et al.* is directed to conveying carriers 3 along a travel path 30 that extends through vacuum processing chambers, while *Lorenz* is directed to conveying cassettes 6 outside of processing chambers. In particular, the "parallel" portion of the *Lorenz* conveyor system is in the primary conveying system 1, which is at least two conveying systems removed from the processing stations 10. In other words, the cassettes 6 must travel on conveying system 3 and handling unit 4 after leaving the conveying system 1 and before reaching the processing stations 10. Therefore, it would not have been obvious to one skilled in the art to look toward the apparatus disclosed in *Lorenz* for suggestions how to modify the apparatus for carrying substrates through vacuum processing chambers as disclosed in *Aruga et al.*

Further, *Aruga et al.* discloses a rotation mechanism having a holding member for changing the direction of the carriers 3. The carriers 3 travel along a length of track and onto a holding member 61. Once supported by the holding member 61, the holding member 61 pivots about one end thereby delivering the carrier 3 to a second length of track that is at a 90 degree angle to the previous length of track. Thus, the vacuum chambers 2 of *Aruga et al.* are not "longitudinally provided" as set forth in Claim 1.

Also, *Aruga et al.* is configured such that the travel path 30 leads the carrier 3 onto the holding member 61. If an additional travel path 30 was included, the holding member 61 would need to be significantly modified to accommodate a second carrier traveling on a second outward or return travel path 30. It would have been clear to one skilled in the art that the addition of a second outward or return carry line would require drastic reconfiguration of the entire rotation mechanism and holding member 61 to accommodate another travel path 30. One skilled in the art would not have been motivated to make such drastic modifications of the apparatus disclosed in *Aruga et al.* to increase capacity as suggested in the Official Action. Besides, *Aruga et al.* discloses another way of increasing capacity by increasing the capacity of the carriers 3. See column 12, lines 39-41.

For at least the reasons stated above, it would not have been obvious to modify the apparatus disclosed in *Aruga et al.* to include a second outward or return carry line.

The Official Action also rejects Claim 11 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,643,629 to *Takahashi et al.* in view of *Lorenz*.

Claim 11 is generally directed to a substrate processing device comprising a number of features including a substrate carry system which passes through an intermediate chamber and a plurality of vacuum processing chambers. The substrate carry system includes an outward carry line, a return carry line, an intermediate line, a branch line, and at least one of a second outward carry line and a second return carry line, wherein each carry line has a different path.

Takahashi et al. discloses an automatic loader for automatically loading a flat unprocessed substrate to a substrate processing apparatus. Cassette stages 22 are filled with wafers and are carried along belt conveyor mechanisms 40 and through vacuum processing chambers 3-6 (the load lock chamber 3, the buffer chamber 4, the cleaning chamber 5, and a sputtering chamber 6) by the belt conveyor mechanism 40.

The Official Action observes that *Takahashi et al.* discloses the apparatus recited in Claim 11 including an outward carry line and a return carry line extending through the vacuum processing chambers 5, 6 except for a system having a branch line with a plurality of outward or return carry lines. The Official Action takes the position that this deficiency is remedied by the disclosure in *Lorenz*, however this position is not accurate for the following reasons.

It would not have been obvious to modify the apparatus disclosed in *Takahashi et al.* in view of *Lorenz* at least because *Lorenz* is directed to non-analogous art. One skilled in the art would not have looked toward the disclosure in *Lorenz* to provide guidance in modifying the apparatus disclosed in *Takahashi et al.*, at least because *Takahashi et al.* is directed to a conveyor belt system that travels through vacuum processing chambers 3-6 while *Lorenz* is directed to an apparatus

having conveyors 5 operating outside the processing centers 2. Also, *Lorenz's* secondary conveying system 3 does not travel through processing chambers, but only leads up to the processing centers 2. See also the arguments set forth above concerning Claim 1. Thus, there would have been no motivation to look toward *Lorenz* for guidance in modifying a conveyor system for conveying substrates through vacuum processing chambers as disclosed in *Takahashi et al.*

Also, there would have been no suggestion to one skilled in the art that the conveyor system of *Lorenz*, having conveyors 5, would be successful if implemented in the apparatus of *Takahashi et al.* which uses a combination of belt conveyor mechanisms 40 and cassette tables 80 in conjunction with vacuum processing chambers 3-6. One skilled in the art would have recognized the added complications involved with operating a conveyor system inside a vacuum processing chambers.

For at least the reasons stated above, Claim 11 is allowable.

Claims 2-10 and 12-15 are allowable at least by virtue of their dependence upon independent Claims 1 and 11.

Thus, it is requested that all of the claim rejections be withdrawn and that this application be allowed in a timely fashion.

Should any questions arise in connection with this application, or should the Examiner feel that a teleconference with the undersigned would be helpful in resolving any remaining issues in connection with this application, the undersigned respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

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